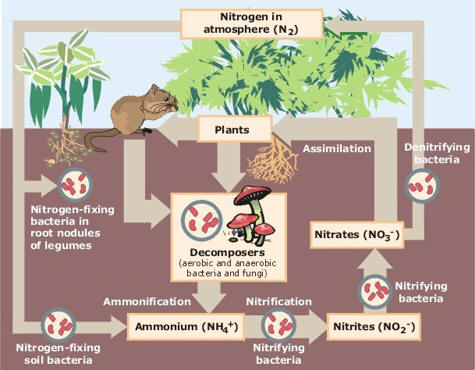
Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Class\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date\_\_\_\_\_\_\_



Nitrogen is an important element that is found in both the organic (living things) and the inorganic (nonliving) parts of the Earth system.  Most of the nitrogen on Earth is found in the atmosphere.  It comprises approximately 80% of our atmosphere where it exists as N2 gas.  Nitrogen can also be found in a variety of forms in plants, animals, soils, ocean, and other reservoirs in the environment.  All plants and animals need nitrogen to make amino acids, proteins, and DNA, but the nitrogen in the atmosphere is not in a form that they can use. This gas must first be converted into a usable form during a process known as nitrogen fixation. Only specialized bacteria in soil and certain types of algae in water can fix nitrogen.  Lightning strikes can also result in some nitrogen fixation.

            Plants get the nitrogen that they need from the soil or water in which they live.  This nitrogen is usually in the form of inorganic nitrate (NO 3-). Nitrate is easily dissolved in water and often leaches out of the soil.  Animals get the nitrogen that they need by consuming plants or other animals, which contain nitrogen within organic molecules.  When organisms die, their bodies decompose bringing the nitrogen into soil or into the oceans.  As these dead organisms decompose, nitrogen is converted into inorganic forms such as ammonium salts (NH 4+) by a process known as mineralization.  These ammonium salts are absorbed by the clay in the soil and are chemically altered by bacteria into nitrite (NO 2-) and then nitrate (NO 3-).  The different paths in which nitrogen may follow as it cycles throughout the earth is know as the nitrogen cycle.

            Human activities have had a huge impact in global nitrogen cycles by causing changes in the amount of nitrogen stored in reservoirs.  The use of nitrogen-rich fertilizers can lead to nitrates from the fertilizers washing into waterways. This increase in nitrate level can cause the rapid growth of aquatic plants during a process known as eutrophication.  These plants will eventually die, decompose and deplete the water of available dissolved oxygen, which can have disastrous affects on the entire food chain.  Additionally, humans are altering the nitrogen cycle by burning fossil fuels and forests, which release nitric oxide, nitrous oxides, and other by-products into the atmosphere where they combine with water to form acid rain and enhance the greenhouse effect.

1. Where, on Earth, is the most abundant source of nitrogen found?
2. Why do all living things need nitrogen?
3. Looking at the diagram, what would happen if there were no nitrifying bacteria in the soil?
4. Looking at the diagram, what would happen if there were no denitrifying bacteria in the soil?
5. What effect do humans have on the nitrogen cycle?